

Appl. No. 09/841,908
Amdt. dated August 11, 2003
Reply to Office Action of April 11, 2003

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Cancelled)
2. (Cancelled)
3. (Currently amended) A method of soil remediation to reduce the concentration level of a contaminant organic compound in soil to a target concentration level, comprising, in sequence, the steps of:
 - a) churning the soil with a soil mixing device;
 - b) during churning, injecting hot air into the soil to thermally strip off organic compounds, including natural and benign organic compounds, ~~until such thermal stripping is no longer practically effective in further reducing to reduce~~ the contaminant concentration level ~~to a decreased level that is still above the target level~~; and
 - c) ~~if, after the preceding step, the concentration level of the contaminant organic compound is above the target level,~~ introducing a chemical oxidizing agent into the soil in an amount that is effective over reasonable time to further reduce the ~~contaminant~~ concentration level of the thermally stripped contaminant level to or below the target level.
4. (Original) A method as in claim 3, wherein the chemical oxidizing agent is a permanganate.
5. (Previously amended) A method as in claim 3, comprising the step of preheating the soil with a ground heater system prior to introducing the chemical oxidizing agent.
6. (Previously amended) A method as in claim 3, comprising the additional step of covering the soil with thermal insulation after introducing the chemical oxidizing agent.

7. (Currently amended) A method of in situ soil remediation to reduce the concentration level of a contaminant organic compound in soil to a target concentration level, comprising, in sequence, the steps of:

- a) comminuting the soil in situ with a trenching tool;
- b) during comminution, injecting hot air into the soil to thermally strip off organic compounds, including natural and benign organic compounds, ~~until such thermal stripping is no longer practically effective in further reducing the contaminant concentration level; and~~
- c) ~~if, after the preceding step, the concentration level of the contaminant organic compound is above the target level, introducing a chemical oxidizing agent potassium permanganate as a crystalline powder~~ into the soil in an amount that is effective over reasonable time to reduce the contaminant concentration level to or below the target level.

8. (Cancelled)

9. (Cancelled)

10. (Previously amended) A method as in claim 7, wherein the step of injecting hot air is continued until the concentration of the contaminant compound is reduced by more than fifty percent of its original level before introducing a chemical oxidizing agent into the soil.

11. (Original) A method as in claim 7, comprising the additional step of preheating the soil with a ground heater system prior to introducing the chemical oxidizing agent.

12. (Original) A method as in claim 7, comprising the additional step of covering the soil with thermal insulation after introducing the chemical oxidizing agent.

13. (Currently amended) A method of in-situ soil remediation with a chemical oxidizing agent to reduce the concentration level of a volatile organic contaminant to a target concentration level, comprising the sequential steps of:

- a) treating the contaminated soil in-situ by a thermal - stripping process in which the soil is churned by a soil mixing device and hot air is injected into the soil as it is being churned to thermally strip off organic compounds, including the volatile organic contaminant; and
- b) determining the concentration level of the volatile organic contaminant remaining after the thermal stripping process; and
- c) further reducing the concentration of the volatile organic contaminant by introducing a chemical oxidizing agent into the soil in an amount that is effective over reasonable time to reduce the concentration level to or below the target level.

14. (Previously added) A method as in claim 13, wherein the step of treating the contaminated soil in-situ by a thermal - stripping process is continued until such thermal stripping is no longer practically effective in further reducing the contaminant level of the volatile organic contaminant.

15. (Previously added) A method as in claim 13, wherein the volatile organic contaminant is from the group of:

benzene, ethyl benzene, toluene, xylene, methylene chloride, 1,2-dichloroethane, 1,1,1-trichloroethane (TCA), carbon tetrachloride, chloroform, chlorobenzenes, ethylene dibromide, tertiary butyl ether, tetrachloroethylene (PCE), trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride.

16. (Previously added) A method as in claim 15, wherein the chemical oxidizing agent is permanganate.

17. (New) A method as in claim 3, wherein the step of injecting hot air into the soil as it is being churned to thermally strip organic compounds is continued until such thermal stripping is no longer practically effective in further reducing the contaminant concentration level.

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18. (New) A method as in claim 3 wherein the contaminant is tetrachloroethylene.

19. (New) A method as in claim 3 wherein the contaminant is selected from the group consisting of benzene, ethyl benzene, toluene, xylene, methylene chloride, 1,2-dichloroethane, 1,1,1-trichloroethane (TCA), carbon tetrachloride, chloroform, chlorobenzenes, ethylene dibromide, tertiary butyl ether, trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride.

20. (New) A method as in claim 7 wherein the step of injecting hot air is continued until thermal stripping is no longer practically effective in further reducing the contaminant concentration level.

21. (New) A method of soil remediation to reduce the concentration level of tetrachloroethylene in soil to a target concentration level, comprising, in sequence, the steps of:

- a) churning the soil with a soil mixing device;
- b) during churning, injecting hot air into the soil to thermally strip off organic compounds, including natural and benign organic compounds, to reduce the tetrachloroethylene concentration level to a decreased level that is still above the target level; and
- c) introducing a chemical oxidizing agent into the soil in an amount that is effective over reasonable time to further reduce the concentration level of the tetrachloroethylene to or below the target level.